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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

MILLER, BRIAN E

ART UNIT

PAPER NUMBER

2627

DATE MAILED: 06/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/624,931	Applicant(s) SAITO ET AL.	
	Examiner Brian E. Miller	Art Unit 2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-24 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/358,123.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                                    |

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Claims 1-24 are now pending.

*Election/Restrictions*

1. Applicants' election of Species (1) in the reply filed on 4/21/06 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

*Priority*

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

*Specification*

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
5. The abstract of the disclosure is objected to because it is not directed to the now claimed invention. Correction is required. See MPEP § 608.01(b).

***Claim Objections***

6. Claim 13 is objected to because of the following informalities: (a) claim 13, lines 14-15, the phrase “wherein a product of saturation...film thickness” appears to not add anything to the claim, and is not linked to any other part of the claim either. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention:

(a) claims 1, 11-13, 22-23, recite language, e.g., wherein said exchange coupling magnetic field has an intensity of at least about 1kOe”, which language is considered to be directed to “desired results”, which render the claims indefinite. It is considered that applicant is not claiming their invention sufficiently as to produce the claimed results. What specific structural limitation(s) permit(s) further results such as “at least about 2kOe” and “at least about 3.5kOe”?

(b) claim 9 & 21 appear to be improper independent claims. If applicant intends to have these claims include all limitations of claim 1 & 13, respectively, they should be written appropriately.

*Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 1-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fontana, Jr. et al (US 5,701,223) in view of Iwasaki et al (US 5,549,978). Fontana, Jr. et al. discloses a spin-valve magnetoresistive thin film element, as shown in at least FIG. 5, comprising: an antiferromagnetic layer 57; a pinned magnetic film 70 contacting the antiferromagnetic layer 57, wherein a magnetizing direction is pinned by an exchange coupling magnetic field between the pinned magnetic layer and the antiferromagnetic layer as known in the art; a free magnetic layer 63; and a nonmagnetic electrically conductive layer 65 formed between the free magnetic layer 63 and the pinned magnetic film 70, wherein a magnetizing direction 77 of the free magnetic layer 63 is aligned so as to intersect with the magnetizing direction 75/76 of the pinned magnetic film 70 (as shown in the FIG.), wherein the pinned magnetic film 70 includes a first pinned magnetic layer 72 contacting the antiferromagnetic layer 57 and a second pinned magnetic layer 74 and a nonmagnetic intermediate layer 73 therebetween, wherein the first pinned magnetic

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layer 72 and the second pinned magnetic layer 74 have different thicknesses (see col. 9, lines 7-10).

With respect to claims 1 & 13 (and similarly for claims 2-3, 11-12, 14 & 22-24), Fontana, Jr. et al. is silent as to “the antiferromagnetic layer comprises one of an X--Mn alloy, where X is selected from the group consisting of Pt, Pd, Ir, Rh, Ru, Os and combinations thereof, and a Pt--Mn--X' alloy, where X' is selected from the group consisting of Pd, Ir, Rh, Ru, Os, Au, Ag and combinations thereof; and wherein the exchange coupling magnetic field has an intensity of at least about 1 kOe.”

Iwasaki et al discloses an MR thin film structure including the use of materials, e.g., NiO or PtMn, for an antiferromagnetic film (see at least col. 50, lines 51-53). From this teaching, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have substituted the AFM NiO film of Fontana, Jr. et al. with a film such as Pt-Mn or the like. The motivation would have been: lacking any unobvious or unexpected results, substituting PtMn (and the like) for the NiO AFM film would have provided a more stable biasing structure for the pinned film, as PtMn films are known to have a high blocking temperature, very stable during head operating ranges and have excellent corrosion resistance properties, which advantages would have prompted such a modification. It is further noted that it has been held to be within the general knowledge of a skilled artisan in the art to select a known material on the basis of its suitability for the intended use; see *In re Leshin*, 125 USPQ 416 (CCPA 1960).

With the above modification, as the thin film MR structure would have been the same as the claimed structure, the Examiner considers the claimed “exchange coupling magnetic field”, i.e.,



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“of at least 1kOe” would be met as well, in far as the actual structure that produces these results has been positively set forth in the claim(s).

Still further, Fontana, Jr. et al. further discloses an AFM layer of about 200 angstroms, (as per claim 4) wherein a ratio of the thickness of the first pinned magnetic layer, e.g., 35 angstroms, and the thickness of the second pinned magnetic layer, e.g., 30 angstroms, is in a range selected from the group consisting of about 0.53 to about 0.95 and about 1.05 to about 1.8, e.g., 1.17.

(as per claim 5) wherein a film thickness of the first pinned magnetic layer and a film thickness of the second pinned magnetic layer are both in a range of about 10 to about 50 angstroms (see col. 7, lines 48-51), and wherein an absolute value of film thickness of the first pinned magnetic layer minus the film thickness of the second pinned magnetic layer is at least about 2 angstroms, e.g., 5 angstroms ( $35-30=5$ ).

(as per claims 6-7) wherein the thickness of the nonmagnetic intermediate layer is in a range of about 4.0 to about 9.4 angstroms (claim 6) or from the group consisting of about 2.8 to about 6.2 angstroms and about 6.8 to about 10.2 angstroms (claim 7), e.g., 2-8 angstroms; (Co-30 angstroms thick;

(as per claim 8) wherein the thickness of the antiferromagnetic layer is in a range of about 100 to about 200 angstroms, e.g., 200 angstroms.

(as per claim 9) A thin film magnetic head, comprising shield layers formed above and below the spin-valve magnetoresistive thin film element according to claim 1, with gap layers therebetween, i.e., shield layers are provided appropriately (see col. 9, lines 22-36) on either side of the MR sensor along with gap layers as known in the art..

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(as per claim 10) wherein the nonmagnetic intermediate layer 73 comprises at least one element selected from the group consisting of Ru, Rh, Ir, Cr, and Re, e.g., Ru.

As claims 13-24 include similar limitations as claims 1-12, they are rejected under the same grounds as described, *supra*.

### *Conclusion*

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian E. Miller whose telephone number is (571) 272-7578. The examiner can normally be reached on M-TH 6:30am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (571) 272-7579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

A handwritten signature in black ink, appearing to read "B E Miller", written in a cursive style.

*Brian E. Miller*  
*Primary Examiner*  
*Art Unit 2627*

BEM  
June 22, 2006